

ABSTRACT

An illumination optical device, wherein a micro channel is not generated practically in a diffractive optical element arranged in an optical path of pulse laser light having high energy density. An illumination optical device having a light source (1) for supplying pulse laser light, wherein an irradiated plane (M) is illuminated with light from this light source. The illumination optical device comprises a diffractive optical element (4) arranged in an optical path between a light source and an irradiated plane, through which a light beam having an energy density of $1 \text{ mJ/cm}^2/\text{pulse}$ or more passes. The diffractive optical element is formed by an oxide crystal material such as quartz crystal.